

COMPONENTS

FAQ

Q How can a faster frontside bus help system performance?

A The frontside bus (FSB) is the interconnect between the processor and every other device and peripheral in a PC, including memory, PCI-E slots and USB ports.

It's a shared bus, so any device that has to talk to the processor must share the FSB bandwidth. As components and peripherals get faster, the FSB can overload. For example, DDR2 800MHz memory can use a huge proportion of available bandwidth. By increasing the FSB speed, more bandwidth is made available, which helps prevent this bus becoming a bottleneck in your PC.

FSB technology applies only to Intel processors and motherboards, though, as AMD's processors use a direct-connect technology called HyperTransport. This gives the processor direct access to peripherals and components with a dedicated link.

David Ludlow
Deputy Editor



david@computershopper.co.uk

ECS N8600GTS-256MX+

★★

£146 inc VAT

So far Nvidia's DirectX 10-compatible graphics chips have all been very expensive. With its new 8600-range, the company is aiming for the mid-range market. ECS's N8600GTS-256MX+ is the first graphics card we've seen to use the GeForce 8600GTS graphics processor. MSI's NX8600GT OC Edition card (reviewed opposite) uses the slightly slower GeForce 8600GT graphics processor.

As with the high-end GeForce 8800-based cards, ECS's N8600GTS-256MX+ uses Nvidia's stream processors rather than pixel pipelines. Stream processors can do the job of a standard shader, draw vertices or even make physics calculations. This means that they can be configured to work in different ways to suit different game environments. For example, creating a 3D room requires only a few vertices, so most of the stream processors can be used as shaders, creating a detailed environment. When creating a large landscape a lot of vertices are needed, so most of the processors can be used for this job instead.

While the high-end 8800GTX has 128 stream processors and the 8800GTS has 96 stream processors, the 8600GTS has just 32, running at 1.45GHz. The card's core runs at 720MHz, while the 256MB GDDR3 memory runs at 1.1GHz (2.2GHz effective). This is slightly overclocked from the reference design's 675MHz core speed and 1GHz (2GHz effective) memory speed.

The N8600GTS's memory has a higher clock speed than a GeForce 8800GTX or 8800GTS, but has only a 128-bit memory interface. The high-end cards have a 384-bit memory interface, so they shift more data at a lower clock speed.

To see how the drastic drop in stream processors from the high-



end cards affects performance, we put the N8600GTS through our demanding set of benchmarks. We weren't that impressed. The Prey frame rate at 1,280x1,024 was good, but not astounding, while our Call of Duty 2 frame rate showed that we'd have to turn down detail settings to make it smoother.

We weren't expecting to get the same results we got from the 8800 cards we've reviewed, but we weren't expecting such a massive drop in performance. It may get better with DirectX 10 games when they're released, but with none available we were unable to test this. For now, a Radeon X1950 Pro, such as Gigabyte's GV-RX195P256D-RH (see 'Also Consider...', below) is much quicker and cheaper, too.

The N8600GTS isn't all bad. Its power requirements are lower than those of its big brothers, so it requires only a single PCI-E power adaptor. The card is considerably shorter, too, and takes up a single slot, so it will fit into most cases. The single fan is quiet, so there are fewer problems with noise.

The potential for better performance in the future doesn't excuse this card's incredibly high price. It's more than £50 more expensive than MSI's similar-performing NX8600GT OC Edition, which is an incredible premium for very little extra performance. For now, the Radeon X1950 Pro, with its considerably better performance and lower price, is a much better choice.

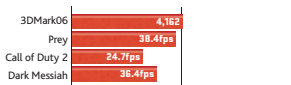
David Ludlow

SUMMARY

- ✓ DirectX 10 compatible
- ✗ Struggled with high detail settings
- ✗ Quite expensive

GRAPHICS CARD Nvidia GeForce 8600GTS, 720MHz core speed, 32 stream processors running at 1.45GHz, 256MB GDDR3 memory running at 1.1GHz (2.2GHz effective), PCI-E x16, two DVI, TV-out
PART CODE N8600GTS-256MX+
SUPPLIER www.dabs.com
DETAILS www.ecs.com.tw

PERFORMANCE (see page 58)



Also consider...

INTEL Core 2 Duo E6700

★★★★★

£301 inc VAT



BEST BUY Intel's new processor is based on the company's mobile technology. It is designed to be much more efficient than the P4. It's incredibly quick, achieving some of the highest benchmark results we've ever seen. You'll need a new Intel 965 or 975-based motherboard to use the E6700, but it's worth every penny, as it's by far the best-value processor you can buy.



PROCESSOR Two cores running at 2.66GHz, LGA775, 267MHz external bus, 4MB L2 cache
PART CODE BX805576700
SUPPLIER www.lambdatek.com
DETAILS www.intel.com
✓ Extremely fast; great value
FULL REVIEW Oct 2006



GIGABYTE GV-RX195P 256D-RH

★★★★★

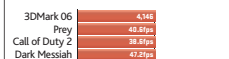
£138 inc VAT



BEST BUY Gigabyte's Radeon X1950 Pro-based graphics card uses a Zalman VF700 cooler, so it's silent as well as powerful. It's incredibly fast, tearing through our games tests with an impressive score of 50.7fps in Call of Duty 2. The price is unbelievable. This is the best-value graphics card you can buy.



GRAPHICS CARD ATI Radeon X1950 Pro, PCI-E x16 interface, 36 pixel pipelines, 256MB GDDR3 memory running at 700MHz (1.4GHz effective), 600MHz core speed, two DVI, TV-out
PART CODE GV-RX195P256D-RH
SUPPLIER www.lambdatek.com
DETAILS www.gigabyte.com.tw
✓ Excellent performance
✗ Fan quite bulky
FULL REVIEW Mar 2007



GIGABYTE

GA-965P-DS3P (Rev 3.3)

★★★★★

£85 inc VAT



Gigabyte's GA-965P-DSP (Rev 3.3) is the first motherboard we've seen that natively supports a 1,333MHz frontside bus (FSB). This FSB speed will be used by some of Intel's new processors; the Core 2 Duo E6550, E6750 and E6850 look set to be the first released. The higher speed means the processor can communicate with peripherals faster, so the overall system performance should be improved (see FAQ, left).

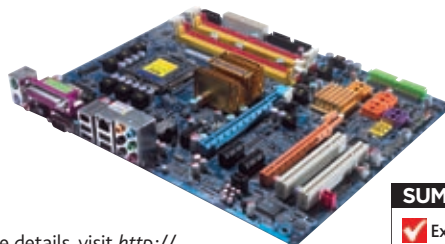
This motherboard is also the first to use all-solid capacitors. Rather than the fluid electrolyte most motherboard capacitors use, solid capacitors use a solid organic polymer. These capacitors have a higher tolerance of higher temperatures and a longer life-span and should make the motherboard more reliable and

stable. For more details, visit <http://tinyurl.com/ysf3ev>.

Although we didn't have a 1,333MHz FSB processor to test with, the GA-965P-DS3P had some of the best performance results we've seen from a motherboard. The board is cooled passively, so the high performance won't mean extra noise. It's a very flexible motherboard with plenty of room for expansion, including two PCI-E x16 slots, so you can use ATI's CrossFire. With three PCI-E x1 and two PCI slots, there's plenty of room for any expansion cards.

If you want to buy a motherboard now that you can use to upgrade to a more powerful processor later, this is an excellent choice.

David Ludlow



SUMMARY

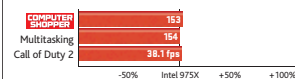
- ✓ Excellent performance
- ✓ Fan-free cooling
- ✓ Supports 1,333MHz FSB processors

INTEL MOTHERBOARD P965 chipset, supports socket LGA775 processors, two PCI, two PCI x1, two PCI-E x16, four DIMM slots, Gigabit Ethernet, four USB2, FireWire

PART CODE GA-965P-DS3P

SUPPLIER www.zomp.netDETAILS www.gigabyte.com.tw

PERFORMANCE (see page 58)



MSI

NX8600GT OC Edition

★★★★★

£92 inc VAT

MSI's NX8600GT is the first card we've seen to use Nvidia's mid-range GeForce 8600GT graphics processor. It has the same 32 stream processors as the GeForce 8600GTS (left), but a slightly lower clock speed. However, this OC Edition of the card has been overclocked from the reference design's core speed of 520MHz to 540MHz. The 256MB of GDDR3 memory has also been overclocked from 700MHz to 800MHz (1.6GHz effective). The stream processors run at 1.2GHz, slightly slower than the 8600GTS's 1.45GHz.

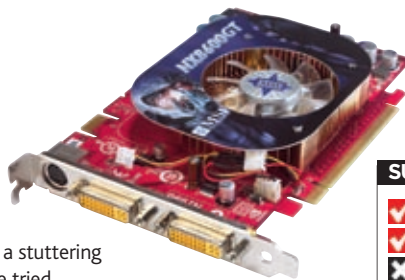
The benchmark results were close to those we got from ECS's N8600GTS-256MX+, but that's not overly impressive. You need to turn off 4xFSAA and even turn down detail settings to get smooth games. Gaming at 1,600x1,200 wasn't possible in our test titles, and Call

of Duty 2 fell to a stuttering 14.8fps when we tried.

The card has two DVI outputs and a TV-out (S-video and component) for connecting to almost any display. This card also draws very little power, so there's no need for a PCI-E power connector. Its single-slot design should appeal to those with small cases.

While ECS's N8600GTS-256MX+ costs £150, the NX8600GT is just £92. If you want a DirectX 10-compatible card for future games and don't mind turning down detail settings, this is a good buy. But as DirectX 10-only games are unlikely to be the norm for at least another year, a Radeon X1950 Pro, which is only a little more expensive, is a better choice.

David Ludlow



SUMMARY

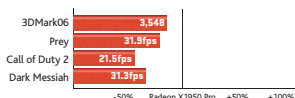
- ✓ Much cheaper than VGTS 8600
- ✓ DirectX 10 compatible
- ✗ Struggles with high detail settings

GRAPHICS CARD Nvidia GeForce 8600GT, 540MHz core speed, 32 stream processors running at 1.2GHz, 256MB GDDR 3 memory running at 800MHz (1.6GHz effective), PCI-E x16, two DVI, TV-out

PART CODE MSI NX8600GT-T2D256E-OC

SUPPLIER www.scan.co.ukDETAILS www.msi.com

PERFORMANCE (see page 58)

MSI
K9AGM2

★★★★★

£37 inc VAT



MSI's K9AGM2 is the best-value motherboard if you want to build a media centre PC. It's a microATX board,

so it will fit in a suitably attractive and small case. It's also got all the outputs that you'll need built in, including an HDMI output for connecting to an LCD. Performance was very good. This motherboard is an absolute bargain.



AMD MOTHERBOARD AMD 690G chipset, supports AMD Socket AM2 processors, one PCI slot, one PCI-E x1 slot, one PCI-E x16 slot, two DIMM slots, one Gigabit Ethernet, four USB2 ports, HDMI

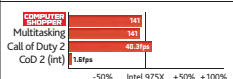
PART CODE K9AGM2

SUPPLIER www.lambda-tek.comDETAILS www.msi.com.tw

✓ Excellent value; HDMI output

✗ Only two memory slots

FULL REVIEW Jul 2007

SHUTTLE
XPC SD32G2

★★★★★

£200 inc VAT



The SD32G2 looks smart, but you'll need an optical drive with a silver bezel to

avoid spoiling its looks. It's easy to build thanks to the detailed instructions. Performance was excellent in our 2D tests, near the top of the recent Labs. With support for Core 2 Duo processors, it's an excellent barebones kit.



BAREBONES PC LGA775 processor socket, two DDR2 533/667 DIMM slots, Intel 945G graphics, one PCI-E x16, two SATA ports, 10/100/1,000 network, six USB2, two FireWire, 7.1 audio, one 5¼in bays, two 3½in bays

PART CODE SD32G2

SUPPLIER www.ebuyer.comDETAILS www.shuttle.com

✓ Plenty of room inside case; easy to assemble

FULL REVIEW Apr 2007

ECS
N8800GTS-320MX

★★★★★

£182 inc VAT



ECS's N8800GTS-320MX has half the memory of other GeForce 8800GTS graphics cards we've reviewed, but it is much cheaper. Fortunately, the performance isn't affected, and we managed to get excellent results from all our games.

GRAPHICS CARD Nvidia GeForce 8800 GTS, 500MHz core speed, 96 stream processors running at 1.2GHz, 320MB GDDR 3 memory running at 800MHz (1.6GHz effective), PCI-E x16, two DVI, TV-out

PART CODE N8800GTS-320MX

SUPPLIER www.dabs.comDETAILS www.ecs.com.tw

✓ Good value; very fast

✗ Vista drivers can be unreliable

FULL REVIEW Jul 2007





GIGABYTE 3D Aurora

★★★★★

£84 inc VAT

Gigabyte's 3D Aurora is a case designed for those who want to make an impression with their PC. Its sleek, brushed metal front and glowing blue panel certainly make this a case that can't be ignored. If you want to kit the inside out with lights, or simply be able to see the blue lights in the two rear-mounted 120mm fans, there's a Perspex side panel that you can use instead of the regular black grille.

As well as being pretty, Gigabyte wants the case to be used by people building high-end computers. In many ways, it succeeds. There are two holes with grommets pre-cut into the case, so it's easy to run water cooling inside without having to drill yourself. Under the power supply's mount there are two hollow rails with cable clips, so you can keep your cables neatly out of the way of the motherboard.

Building a PC into the case is simple, as the five external 5¼in drive bays and two external 3½in drive bays all use a screw-less locking system. Once your drive is in place, moving the slider across pushes out the two retaining metal tabs that lock into a drive's screw holes.

There are four hard disk bays, which require mounting rails. They're easy to fit, but there are no rubber grommets to help keep noise from vibration down. Two bays come occupied with a plastic toolbox that you can use for storing spare rails and cables, but it's easily removed if you want more storage. The motherboard tray isn't removable, but there's lots of space inside the case to fit an ATX motherboard with ease.

The two rear 120mm fans are powered by a single three-pin motherboard connector. If your motherboard doesn't support fan control then there's no manual speed dial, which is a shame. The sides of the case are also a little thin for our liking. The 3D Aurora doesn't feel as rigid or as well built as Antec's P182 (right).

The 3D Aurora is attractive and it's not bad value, but the P182 feels much better built and its understated design will appeal to more people.

David Ludlow

SUMMARY

- ☒ Looks great
- ☒ Screw-less design
- ☒ Thin side panels

PC CASE ATX case, two 120mm fans, two USB2, one FireWire, two audio ports, five 5¼in drive bays, six 3½in drive bays (two external)
PART CODE 3D AURORA
SUPPLIER www.dabs.com
DETAILS www.gigabyte.com.tw



ANTEC P182

★★★★★

£83 inc VAT



Antec's P182 is the replacement for the company's successful P180 enthusiast's case. From the outside, you'd be hard pushed to tell the difference between this case and its predecessor, but that's no bad thing. The P180 was an attractive case and so is the P182. It keeps the P180's fin, which covers the top fan with a grille. It also keeps the same front door that neatly hides away your drives. Finally, it's the same gorgeous piano black.

The inside is familiar, too. The power supply is mounted at the bottom of the case in its own compartment. This helps with cooling, but means you're often left with an unattractive and messy spread of power cables running over the top of your motherboard.

There's plenty of space for drives. There are four external 5¼in drive bays, with mounting rails for each. There's one external 3½in bay for a floppy disk or memory card reader, and six internal 3½in bays for hard disks. Disks are all screwed in through rubber grommets, which helps reduce noise by preventing vibrations.

The motherboard tray isn't removable, but there's plenty of room to work inside the case, and you'll have no trouble fitting an ATX motherboard. With rolled metal edges inside the case, you won't cut your hands to shreds when you're building it.

So far, this is very similar to the P180. However, the top and rear 120mm fans now have their speed controls mounted neatly on the rear, so you can adjust them without having to open the case. The bottom fan still has a three-speed control inside, though. If you want to use water cooling, you don't need to cut holes in your case or mount an ugly bracket; Antec has done the job for you with two holes on the rear with fitted grommets.

Best of all, the P182 is a few pounds cheaper than its predecessor. If you are building a high-specification PC, this is the best case you can get.

David Ludlow

SUMMARY

- ☒ Neat design
- ☒ Lots of space inside
- ☒ Power cables can be messy

PC CASE ATX case, three 120mm fans, two USB2, one FireWire, two audio ports, four 5¼in drive bays, seven 3½in drive bays (one external)
PART CODE 0761345-09182-4
SUPPLIER www.morecomputers.com
DETAILS www.antec.com

CHOOSING AN... Intel Motherboard

Follow the steps to find your ideal specs

MOTHERBOARD CHIPSET: Intel 945

ONBOARD GRAPHICS: Yes

GRAPHICS CARD SLOT: One PCI-E x16

Recommended minimum in grey

1 A basic motherboard with the above specifications costs around £65. It will support the Pentium 4 and D-range of dual-core processors. As it has onboard graphics, you can use it for standard Windows applications without having to buy a dedicated graphics card.

2 If you want to play games, a PCI-E x16 slot will let you install a dedicated graphics card. If you want to use dual graphics, you'll have to choose between ATI and Nvidia. ATI's CrossFire requires a motherboard with two PCI-E x16 slots and an Intel 945X, 955X or 975X chipset, or an ATI chipset. SLI requires two PCI-E x16 slots and an Nvidia nForce 4 or higher chipset.

3 If you want to build a Media Center PC, look for Viiv compatibility, as this will provide a quick-resume-from-standby feature, which makes your PC wake up much faster. You may also want to get a microATX motherboard, as this will let you build your PC in a smaller case.

4 Choose a motherboard that takes the processor you want to use. If you want Core 2 Duo, or will upgrade to it later, you'll need a motherboard that supports it. Nvidia is working on its chipset, so you will need an Intel 965- or 975-based motherboard. Check the manufacturer's website before you buy, though, as not all 975 motherboards support Core 2 Duo.

If you want to use a mobile processor to build a smaller, quieter PC, you'll need a Socket 479 motherboard. Check for compatibility with the mobile version of Core 2 Duo if you think you'll want to make this upgrade.

5 If you're installing lots of expansion cards, look for a motherboard with plenty of PCI and PCI-E x1 slots. If you're going to install a lot of storage in your PC, a motherboard with plenty of SATA ports is essential. Ideally, it should be one that supports RAID, as this gives you a simple way of improving performance or protecting your data.